

Math Virtual Learning

AP stats / Chi Squared test of Homogeneity May 15, 2020



Lesson: May 15, 2020

Objective/Learning Target: Students will be able to apply the Chi Squared test of Homogeneity to answer questions.

Review #1

Which of the following are true statements?

- 1. The histogram of a binomial distribution with p=0.5 is always symmetric no matter what the value of n.
- 2. The histogram of a binomial distribution with p = 0.2 is skewed to the left.
- 3. The histogram of a binomial distribution with p=0.9 looks more and more symmetric, the larger the value of n.

Review #2

Suppose two events, E and F, have nonzero probabilities p and q, respectively. Which of the following is impossible?

- 1. p+q>1
- 2. p-q<0
- 3. p/q>1
- 4. E and F are neither independent nor mutually exclusive.
- 5. E and F are both independent and mutually exclusive.

Answers

- 1. 1 and 3 are true. With p=0.2, there are low probabilities of a greater number of successes so the histogram is skewed right. Also remember that the binomial converges to the normal distribution for larger values of n, no matter what the p is.
- Answer is 5. Independent events, means if E happens, the probability of F happening has not changed. Mutually exclusive mean if E happens, F cannot happen. If F cannot happen its probability has clearly change, so these properties cannot happen together.

Chi Squared GOF test

In the previous two lessons we worked on understanding the Chi squared GOF test. This test is able to compare the outcomes of a single sample with a multilevel categorical variable to a theorized distribution. For example, we could compare the proportions of colors of M&Ms in a bag to the percents that the company claims.

This is kind of like our one proportion z-tests in that we are comparing the sample to a theorized value. We can also compare two separate samples. We could answer something like does the distribution of people's political affiliations differ between Missouri and Kansas. We would take a sample from each state and compare the political affiliations between the two samples. The following video outlines this process: <u>Chi squared test of homogeneity</u>

Extra practice

Reading: pg 696-722

HW: 19-22, 27, 29, 31, 33, 35, 43, 45, 49, 51, 53-58